DEVELOPMENT OF NOVEL METHODS FOR HUMAN IRIS IDENTIFICATION AND RECOGNITION

For Degree of Philosophy in Computer Science
Under Faculty of Science & Technology

Synopsis
Submitting to
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1. **Introduction :**

Today with the development of Artificial Intelligence (AI) algorithms, Human Iris Identification and Recognition systems may gain speed, hardware simplicity, accuracy and learning ability. Biometrics technology plays important role in public security and information security domains. Using various physiological characteristics of human, such as iris, retina, 2D & 3D face, facial thermo grams, fingerprint, hand geometry etc., biometrics accurately identify each individual and distinguishes one from another.

Iris recognition consists of the iris capturing, pre-processing and recognition of the iris region in a digital eye image. Iris image pre-processing includes iris localization, normalization, and enhancement. Each of these steps uses different algorithms. In iris localization step, the determination of the inner and outer circles of the iris and the determination of the upper and lower bound of the eyelids are performed. The inner circle is located between the iris and pupil boundary, the outer circle is located between the sclera and iris boundary.

Human Iris Identification and Recognition is that the one in all most up-to-date analysis space in Human Iris Image process, this can be difficult task as a result of matching within the presence of outliers, matching within the presence of noise. Recognition of geometrically, measuring remodeled Iris images, read purpose modification and looking images in guide information.

2. Review of Literatures:

1. John Daugma, “How Iris Recognition Works”. IEEE Transactions On Circuits And Systems For Video Technology, Vol. 14, No. 1, **January 2004**.

   The author has explained the iris recognition algorithms and presented results of 9.1 million comparisons among eye images from trials in Britain, the USA, Japan, and Korea, in the present paper.

2. Rahib H.Abiyev, Koray Altunkaya,“Personal Iris Recognition Using Neural Network”,International Journal of Security and its Applications Vol. 2, No. 2, **April, 2008**.

   The author has presented personal iris recognition system by using nueral networks. The paper contains the study of average time for iris recognition and achievement of 98.62% segmentation accuracy. By using vector as input signal to recognize the iris pattern and the accuracy is 99.25%.

3. P. Lorrentz , W. G. J. Howells , and K. D. McDonald-Maie, “FPGA-based enhanced probabilistic convergent weightless Network for human Iris recognition”, ESANN'2009 proceedings, European Symposium on Artificial Neural Networks - Advances in Computational Intelligence and Learning. Bruges (Belgium), 22-24 **April 2009.**

   In this paper the author has concluded that the presented preprocessing method is very efficient and he has recommended for the further enhancement study. The study also includes a hardware implementation of a weightless neural network which is successfully developed in an iris recognition system. The performance of the system has evaluated by the author and found effective and suitable.

4. Ajay Kumar, Arun Passi, "Comparison and Combination of Iris Matchers for Reliable Personal Authentication", Pattern Recognition vol. 43, pp. 1016-1026, **Mar. 2010.**

   The study of the comparative performance from four different approaches for the iris identification is at the core of this paper. The author has also investigated the possible performance improvement using score level combination. The author has made an emphasis on the user authentication and extension of this work for the further study.

5. Khattab M. Ali Alheeti,"Biometric Iris Recognition Based on Hybrid Technique", International Journal on Soft Computing, Vol.2, No.4, **November 2011.**

   In this paper, the author, has found that the many business applications in the future will be more relayed on biometrics recognition system. It has been proved very effective in protecting information and resources in a vast area of application. The paper consist of the study of biometric iris recognition system via wavelength transform and edge recognition techniques.

6. Richa Chaturvedi , Y.S Thakur, "Iris Recognition using Daugman's Algorithm and ANN", International Journal of Applied Engineering Research, Vol. 14, **Number 21 , 2019.**

   The paper deals with the study of use of highly classified and secure applications for reliable security system to prevent unauthorized trespassing. In this work the iris localization has been performed by using Daugman's Algorithm and this system found capable of effective segmentation of regular shapes.

3. Objectives of Research:

- To study various technologies available for Human Iris Identification & Recognition and design, develop a method using Soft Computing techniques.
- To test the developed tool under varying circumstances

4. Methodology to be adopted:

The projected analysis work involves study of the Human Iris Identification & Recognition image process. The designing and development of new algorithm for Iris image recognition using soft computing technique. Also by using software tools such as MATLAB/Tools, the method will be implemented. The specified knowledge assortments are going to be either performed by discrimination out there info on the web or manually sure info are going to be created.

5. Importance of study:

i) International status:

Over the last twenty five years, Human Iris Identification & Recognition has become a popular area of research in computer vision and one of the most successful applications of **Aadhaar** began operation in 2011 in India, whose government is enrolling the iris patterns (and other biometrics) of more than ten billion residents for Aadhaar scheme for entitlements distribution, run by the Unique Identification Authority of India. Because of the nature of the problem, not only computer science researchers are interested in it, but neuroscientists and psychologists also. It is the general opinion that advances in computer vision research will provide useful insights to neuroscientists and psychologists into how human brain works and vice versa.

ii) Significance of the study:

- A lot of research work is carried in the area of Human Iris Identification and Recognition
- In India we find that very few people are contributing in the area of Human Iris Identification & Recognition
- Human Iris Identification & Recognition is still not 100% achieve, so there is scope for contribution in this area.

6. Proposed work Plan:

Year-wise Plan of work and targets to be achieved:

I. 15th July 2021-15th July 2022:

- Collection of Research Papers
- Complete Course Work.
- Study of MATLAB and Others Software/Tools.
- Attending International/National/State Conferences & Published One or Two Research Papers.

II. **15th July 2022-15th July 2023:**

- Manually Iris database will be created.
- Collection of Research Papers
- Two research papers publishedin International Conferences.

III. **15th July 2023-15th July 2024:**

- Study of Soft computing techniques.
- Feature extraction techniques implemented in MATLAB/Tools software.
- Human Iris Identification &Recognition algorithms is developed using soft computing techniques.
- Test developed algorithms in different circumstances.
- Two or More research papers published in UGC referred Journals.

7. References

1. John Daugma, “How Iris Recognition Works”. IEEE Transactions On Circuits And Systems For Video Technology, Vol. 14, No. 1, **January 2004**.
2. Rahib H.Abiyev, Koray Altunkaya,“Personal Iris Recognition Using Neural Network”,International Journal of Security and its Applications Vol. 2, No. 2, **April, 2008**.
3. P. Lorrentz , W. G. J. Howells , and K. D. McDonald-Maie, “FPGA-based enhanced probabilistic convergent weightless Network for human Iris recognition”, ESANN'2009 proceedings, European Symposium on Artificial Neural Networks - Advances in Computational Intelligence and Learning. Bruges (Belgium), 22-24 **April 2009.**
4. Ajay Kumar, Arun Passi, “Comparison and Combination of Iris Matchers for Reliable Personal Authentication”, Pattern Recognition vol. 43, pp. 1016-1026, **Mar. 2010.**
5. Khattab M. Ali Alheeti,“Biometric Iris Recognition Based on Hybrid Technique”, International Journal on Soft Computing, Vol.2, No.4, **November 2011.**
6. Ashish kumar Dewangan, Majid Ahmad Siddhiqu, “Human Identification and Verification Using Iris Recognition by Calculating Hamming Distance”, International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-2, Issue-2, **May 2012**
7. Gaganpreet kaur , Dilpreet kaur , Dr. Dheerendra Singh, “A Study of various soft computing techniques for iris recognition”, IOSR Journal of Computer Engineering,Volume 9, Issue 6 , **Mar. - Apr. 2013.**
8. Mrs. V. S. Dhongde , Prof. M. R. Wargantwar , Mrs. S.G.Joshi, “IRIS Recognition Using Neural Network”, IJIRSET, Vol.3,Special Issue-4, **April 2014.**

9. Richa Chaturvedi , Y.S Thakur, “Iris Recognition using Daugman’s Algorithm and ANN”, International Journal of Applied Engineering Research, Vol. 14, **Number 21 , 2019.**
10. Usham Dias, Vinita Frietas, Sandeep P.S., Amanda Fernandes “a neural network based iris recognition system for personal identification”,ICTACT Journal on Soft Computing, ISSUE: 02, **OCTOBER 2010.**
11. Leila Fallah Araghi, Hamed Shahhosseini, Farbod Setoudeh, “IRIS Recognition Using Neural Network”, IMECS 2010, Vol I, **March 2010**.

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